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\$200m contract award underway

By Carol Youkey,
Huntsville Center

Huntsville Center employed a new contract strategy earlier this year with the issuance of a Request for Proposals (RFP) for Ordnance Response and Services for Continental United States (CONUS) and Outside the Continental United States (OCONUS) sites. The RFP was structured unlike previous versions for work at multiple sites in that it includes an entire range of services, from preliminary fieldwork, studies, and analyses through removal actions. More importantly, this broad range of services requires the contractor to implement a total management strategy, based on an engineering approach, and to integrate all of the activities at an ordnance site.

For the past several years, Ordnance and Explosives (OE) work has been accomplished through the use of several independent contracts. For example, if an Archives Search Report indicated additional investigation was required at an OE site, the first contract action was normally the award of an Engineering Evaluation/Cost Analysis (EE/CA) task order to an Architect-Engineer (A-E) firm, under one of Huntsville's indefinite delivery-indefinite quantity A-E contracts. The comple-



tion of the EE/CA work was normally followed by the award of a removal action task order to a services contractor for the actual detection and removal of OE from the site. These two primary contract actions were often supplemented by other smaller task orders to surveying firms, geophysical mapping firms, geographical information systems/data management firms, and statistical analysis firms.

The result was pretty much a "piecemeal" approach and the new acquisition strategy is designed to bring an integrated approach, as all of the activities covered by the individual independent contracts are now included in the scope of the new contracts. Implementation of the new contracts is expected to improve data management and integration, cost and schedule efficiencies, and take advantage of the application, benefits, and advancement of innovative technologies for OE response projects. The

emphasis of future work is expected to shift from excavation and removal of all metallic anomalies to extensive up-front analysis and more efficient data management over the life of the project to reduce OE excavation and disposal costs.

This approach is gaining popularity. It was recently used in a stand-alone contract awarded for OE work at Fort McClellan, Alabama. A

procurement with similar technical scope is also underway in the Sacramento District for work at Fort Ord, Calif.

The RFP for the \$200M procurement was issued on March 17 and was followed by a pre-proposal conference in Huntsville on March 23. Over 120 persons attended the conference, indicating a large interest in the acquisition. Proposals were received on April 20 and proposal evaluation began for the first phase. The acquisition process is structured to allow the best of the proposals to be evaluated in a second and final phase. Multiple contracts are anticipated and will be made during late summer or early fall. The total of all contracts awarded will not exceed \$200M over a period of five years.

Three of the contracts are reserved, one for a qualified 8(a) firm, and two for small business concerns. Additional awards are expected and will be made on a full and open competitive

(See \$200m contract, page 6)

INSIDE

2

Business strategies

3

UXO Forum 2000

4

UXO Union issues

6

DGM contract award

7

Classification of
secondary explosives
in environmental media

8

Range cleanups top
Corps priority list

9

Japan District assists
with ammo furnace

10

Honolulu District
cleans up Guam site

11

Two pit excavations
complete at
Spring Valley

12

CWM removal project
begins in Memphis

13

Innovative technology:
Thinking out of the box

15

SWPG work compares
"mag & flag" to digital
geophysics

16

Upcoming events



Director's corner

Strategic plan, safety top initiatives

Since I communicated our business development strategy in last quarter's newsletter, I would like to discuss recent actions that support this initiative.

We are continuing to map a strategic plan for the future OE mission. We have made major strides in our business initiatives and leveraging the entire Corps of Engineers as a contributor to supporting the total army vision statement in the OE program of the future. This is a major strategic initiative for the OE program

I have representatives from the safety office and the business team working on a new concept that we are calling the "Virtual OE Safety Specialist Team." The core of our OE program is the OE safety specialist. Currently, the Corps has safety specialists located nationwide. If we are to continue to improve and develop our Corps OE program, we will need flexibility in optimizing Corps safety assets.

Finally, I will continue to look at the communication tools for the OE program, including this newsletter, to ensure the publication proves itself "value added" to the Corps family. We appreciate the suggestions and comments of our readers, partners and customers and will incorporate your ideas whenever possible.

--**David Douthat**



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**Environment
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Business team update

*By Glenn Earhart,
Huntsville Center*

The Ordnance and Explosives (OE) Directorate of the Huntsville Center is working on a number of strategic business initiatives utilizing the entire Corps of Engineers' infrastructure. These strategic initiatives include: (1) transferring removal actions to Major Subordinate Command (MSC) Districts after coordination with the OE Mandatory Center of Expertise (MCX); (2) "Supporting the Total Army" initiatives by providing OE support to installations for range scrap, design, clearance, and OE safety specialists support; (3) continuing negotiations for the OE Business Plan and; (4) initiating and maintaining dialogue with the MSCs, Districts and the Regional Business Centers (RBCs).

Huntsville Center has been actively involved in providing OE services support to Army, Marine, Navy and Air Force installations. These services include scrap removal, range design reviews, and negotiations with steel mills and foundries for smelting capabilities. Training, surveying, and general OE consulting, along with OE removal activities have also been provided.

These support services all fall under the Corps of Engineers' initiatives. The objective of this support service is to provide the Department of Defense (DoD) with services that are cost effective and consistent with the Corps' high safety and quality standards.

(See Business team, page 6)

Donovan Chamber successfully dem- onstrated at MMR

Huntsville, Ala.--The T-10 Transportable Donovan Blast Chamber, manufactured by DeMil International, Huntsville, Ala., made a successful East Coast debut at the Massachusetts Military Reservation (MMR) on Cape Cod June 14.

The demonstration involved the detonation of explosives equivalent to six pounds of TNT. The unique technology destroys Unexploded Ordnance (UXO) without damaging the environment by quenching and cooling the blast with water and controlled expansion, capturing particles as small as one-half micron generated by the blast, and filtering the gases from the blast through an air pollution control system before they are released into the air.

The demonstration marked the start of an environmentally friendly cleanup program using the T-10 to clean up UXO resulting from training operations at the National Guard's Camp Edwards.

Mindy Lubber, administrator of U.S. EPA Region 1 said the demonstration marked "a great day for Cape Cod and the many communities in America where unexploded ordnance on military ranges are literally environmental time bombs...[N]ow, for the first time, UXO can finally be eliminated in a way that is clean instead of a way that spreads pollutants in our environment...[And] we know all too well that is what happens with the standard UXO disposal method open detonation."

DeMil International is working with Sudhakar, Inc., also of Huntsville, under a contract with the U.S. Army Corps of Engineers. For more information call Andy Lowery at (256) 536-6885.

UXO Forum 2000 emphasizes new partnerships for the millineum

By Kim Gillespie, Huntsville Center

The Department of Defense's first UXO/Countermine Forum of the year 2000 was held May 2-4 in Anaheim, Calif. This was also the first year that countermine technologies and issues were incorporated into the event. Also new this year were outdoor technology exhibits.

Over 80 technical presentations were made, with roughly 500 attendees and nearly 70 exhibitors. The U.S. Army Corps of Engineers had over 20 individuals participating as presenters, session chairs and/or panelists. The Corps' Engineers Research and Development Center (ERDC) also served as a sponsor of the Forum.

"You are part of a global conference to network, market technologies and programs, and gain a clearer understanding of DoD's programs for industry," stated Col. Daniel T. Tompkins, USAF, and the Department of Defense Explosive Safety Board's Chairman in his welcoming letter to participants.

The Forum began with Keynote speaker Lt. Gen. Paul Kern, Military Deputy to the Assistant Secretary of the Army, addressing countermine issues and technology. In his address, "UXO/Countermine Technologies...Eliminating Inexpensive Killers," Kern related his first hand experiences with losing two fellow soldiers to landmines in Vietnam, and the increasing danger and need to immediately implement mine clearing efforts in hot spots like Bosnia, and even the demilitarized zone in Korea. "In 15 to 20 years, I hope you will not be able to relate stories about losing friends to mines."

Gary Vest, Principal Assistant Deputy Under Secretary of Defense, spoke of "Active Range Clearance and UXO Environmental Remediation: Where We've Been, Where We Are, and Where We Are Going," in his keynote address. He emphasized that what needs to be done for range clearance and environmental remediation "is not optional," and that the solution must be "comprehensive development, planning and executing."

He also pointed out that the government is not alone in providing solutions, but that there must be a "genuine partnership" between the government, private sector, regulators and the public. But Vest, noting extensive statutory and congressional mandates for Base Realignments and Closures and particularly the issue of range

cleanup, ventured out in new territory, proclaiming it, "not an environmental problem, not a safety problem, but a land use problem," and called for better understanding of, cooperation with, and responsibility for local authorities in UXO cleanup decisions.

Vest cited DoD Directive 4715.11, "Environmental Safety and Explosives Management on Active and Inactive Ranges," as providing the process for "consistency" that needs to guide the behavior of all UXO range cleanups. "The standard for cleanups emerges from the process," he concluded.

Maj. Gen. David Gust, Deputy Chief of Staff, Research, Development and Acquisition, presented the "UXO Center of Excellence (UXOCOE) Progress Report," while Dr. Jeff Marqusee, Director of the Environmental Security Technology Certification Program of DoD and Technical Director, Strategic Environmental Research and Development Program, ended the opening speeches with "UXO Technology: Where Are We and Where Are We Going?".

Dr. Marqusee spoke of the need for technology-based data and information, such as digital geophysical mapping, to ensure reproducible survey results. He also emphasized that reproducible data is imperative to enlisting stakeholder buy-in. Scott Millhouse, with Huntsville Center's Advanced Technology Team, is in total agreement. "These are the exact technology initiatives and issues we've been working on," said Millhouse. One of Millhouse's three presentations at the Forum, "Digital Geophysical Mapping vs. 'Mag and Flag' as Evaluated at Southwest Proving Ground," compared the results of a scientific evaluation between DGM and "mag and flag" techniques as evaluated at the former Southwest Proving Ground, Ark. (see story page 15). "Our presentations at this year's Forum were very timely," added Millhouse.

Glenn Earhart, with Huntsville Center's

(See UXO Forum, page 16)



Above, one of the 70 exhibits at the Forum.

At left, Lt. Gen. Paul Kern presents the keynote address.

Huntsville Center responds to UXO Union issues

The Laborers' International Union of North America (LIUNA) UXO Workers Local 630, approached Huntsville Center through their representative, Mr. Russell Shattles, about several issues. Huntsville Center representatives from the Ordnance and Explosives, Contracting and Legal Directorates met with Mr. Shattles and agreed to address the Union's questions and issues at a LIUNA breakfast at the UXO Forum in May. Below are the Union's questions and the Huntsville Center's answers that were discussed at the May meeting.

Discrimination against unionized UXO contractors by the U.S. Army Corps of Engineers (USACE): Fact or fiction?

LIUNA UXO Workers: How does the USACE respond to the insinuation that they will discriminate against UXO contractors who sign Collective Bargaining Agreements (CBAs) and potentially increase the cost of doing business to the government?

Huntsville Center: Huntsville Center will not discriminate against UXO Contractors who sign CBAs. It needs to be understood, however, that price is always a consideration in the award of a contract action. There are other considerations as well, such as technical or past performance, which may play a dominant role in the evaluation process, whereas, it may be in the best interest of the Government to consider award to other than the lowest priced offeror (the technically highest rated offeror). This can also work in reverse, whereas, award to other than the highest technically rated offeror (the lowest priced offeror) may be in the best interest of the Government - given that all other factors are equal. This is the way that we have been doing business, and this is the way we will continue to do business.

LIUNA UXO Workers: What incentives does the USACE see in a UXO contractor providing a stable unionized work force? Can this be an incentive in contracting?

Huntsville Center: This is what you, the UXO contractor, need to tell USACE. What do you see as the advantage in a unionized work force? What type of benefit does this offer to the government? How/why can this be a benefit to the government?

LIUNA UXO Workers: Regarding contracting, does being signatory to a CBA bring with it any disqualifying factors that non-unionized contractors do not have?

Huntsville Center: No. Whether you have a signed CBA or not, you will be treated equitably in accordance with (Federal Acquisition Regulation (FAR) requirements. Any offers received will be given equal treatment.

LIUNA UXO Workers: What guarantee does my company have that the actual practice (at the contracting agency and in the field) of non-discrimination is the same as the official policy?

Huntsville Center: It's the law. We play by the rules and will not deviate from them. The Corps currently and historically has contracts with unionized companies (from other programs).

Service Contract Act (SCA) Price Adjustments and CBAs

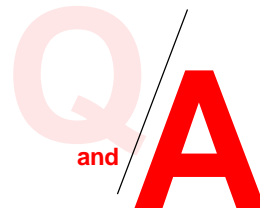
LIUNA UXO Workers: If my company signs a CBA that includes a wage and benefits increase, when can we reasonably expect to see reimbursement through the price adjustment process of the Service Contract Act?

Huntsville Center: We must emphasize that the Service Contract Act falls under the authority of the Department of Labor (DOL), so the Corps' only authority is to implement what the Department of Labor establishes. When a signed CBA has been submitted, accepted and then issued by the DOL, the new wage determination will be incorporated by modification to the contract, and will become effective immediately upon execution of the modification for any new requirement (new work) or after work on an existing requirement has reached a year's performance or upon the exercise of an option year of a contract. The new wage rates are NOT RETROACTIVE. A contractor will be paid in accordance with the prompt payment clause in the contract, after receipt of an invoice/voucher, for work completed, delivered and determined to be acceptable for payment.

LIUNA UXO Workers: What collective bargained monetary increases are actually reimbursed through the Service Contract Act?

Huntsville Center: Any adjustments will be limited to increases in wages and fringes, and the accompanying increases in social security, unemployment

(See UXO Union issues, page 5)



UXO Union issues

(Continued from page 4)

taxes and workmen's compensation, but will not include General and Administrative (G&A) costs, overhead or profit.

LIUNA UXO Workers: If my company signs a CBA that increases wage rates which become the new Wage Determination (WD) at DOL, is it for the entire county (or counties) or just that specific site?

Huntsville Center: Determinations are issued by county or counties, which means that a determination may apply to more than one specific site which may fall within the WD's county or counties.

LIUNA UXO Workers: Regarding wages, our company prefers to negotiate a single, national wage rate because we feel confident we can compete on our ability to manage a contract even with higher than average wages. How are price adjustments applied in such a situation (a national wage increase)?

Huntsville Center: DOL quit issuing regional wage rates a few years back. They do not issue national wage rates either. If you are able to negotiate that type of wage rate, then once negotiated, it would be submitted to DOL for approval (as long as it was reasonable, done at arm's length, etc.), and when accepted by DOL, incorporated upon issuance of new task order (new work); upon exercise of option; or when a task order goes beyond 12 months and a new wage decision has to be requested and incorporated.

LIUNA UXO Workers: I'm on a firm fixed-price contract with a set sum of money. What happens when increased labor costs (due to a collective bargaining agreement) take my expenditures above that amount?

Huntsville Center: The increased rates will be incorporated into the contract by modification and will apply only to new requirements. Ongoing work that is unchanged is not affected. There will have to be a changed condition that will be negotiated, before the new rate applies.

Service Contract Act Wage Determinations as made by the DOL

LIUNA UXO Workers: When is the USACE required to re-verify wage determinations?

Huntsville Center: This is addressed in the Corps' Engineering Pamphlet (EP) 1180-1-1 under SCA Price Adjustments, which reads as follows: "The Corps incorporates annual WD revisions into the contract when options are exercised, annual appropriations (new fiscal year funds) are added, or when the scope of work is significantly modified, provided the WD revisions are received timely in accordance with FAR 22.1012."

LIUNA UXO Workers: If the Wage Determination goes up how does my company recover the increase that we must immediately pay to the employees?

Huntsville Center: The company is obligated to pay the wages based on the wage decision incorporated into the contract or specific task order. If the company agrees to pay higher rates immediately to the employees, the company will not necessarily recover that increase. If the new rates are incorporated into the contract/task order, then the government will pay those rates.

LIUNA UXO Workers: When will Quality Control (QC) and Site Safety Officer (SSO) positions be covered in the Wage Determinations?

Huntsville Center: We do not know. When the positions for UXO workers were submitted to DOL, QC & SSO were included. We do not know why DOL did not generate those occupations and classifications along with the other categories. DOL will have to answer this.

LIUNA UXO Workers: When labor rates go up as a result of an increased wage determination (DOL directed or as the result of a CBA), is my reimbursement limited to the amount of the increase or is my loaded rate applied?

Huntsville Center: See response under SCA Price Adjustments and CBAs.

USACE and Other Industries Under CBA's

LIUNA UXO Workers: Has Huntsville actually administered price adjustments as the result of collectively bargained rate increases?

Huntsville Center: Not on the ordnance program. However, there are other programs where the companies are unionized and in accordance with contract clauses/procedures where those types of price adjustments have probably been made.

LIUNA UXO Workers: Does Huntsville have any contractors currently operating under an option year who have gone through a price adjustment as a result of a CBA in a base year?

Huntsville Center: Not on the ordnance program. However, we would follow DOL FAR requirements if we had a CBA.

Hazardous Duty Pay (HDP)

LIUNA UXO Workers: It has been circulating that the USACE is working with LIUNA to get HDP approved for the workers in the field. If successful, how will this benefit actually be passed down to our employees and how will it be budgeted in our contracts?

Huntsville Center: USACE would not oppose HDP. If successful, it would be incorporated in a contract by modification using the same process as incorporating a wage determination, e.g., annually for exercise of option; at time of new task order award.

Four firms receive DGM contract awards

By Scott Millhouse,
Huntsville Center

Huntsville Center initiated a procurement for selection of vendors to provide Ordnance and Explosives (OE) Industry standard Digital Geophysical Mapping (DGM) services. This was an unusual contracting approach since a test program for a Request for Quotations under Federal Acquisition Regulation subpart 13.5 was utilized.

This approach allowed the Center to solicit for \$4.95 million of services by individual task orders over a two-year period. This approach permitted a more streamlined acquisition and selection process that greatly reduced both the contractor's efforts for proposal and the Government's efforts for

selection. Additionally, it reduced the selection time and cost.

DGM methodologies have seen recent widespread use in both characterization and removal actions. At sites where the customers require a more engineering based approach and permanent record, they have been replacing the more traditional "mag and flag" approach.

Until this contract selection, the only way the Center has been able to acquire these services has been through a prime OE contract as a subcontractor supplied service. The Center had been disconnected from direct involvement in technology and quality measurements and optimization.

This new contract allows Huntsville to pick the

appropriate vendor, technology, and optimize the approach to match project needs at any location. The contract provides a complete menu of services by area or pathway survey using all readily available equipment and processing methodologies. Variations in topography and vegetation are adjusted by factors applied to the base unit prices.

This competitive selection process awarded a contract to the top four contractors; CHEMRAD, SC&A, GEOPHEX and NAEVA. All four have been awarded the first task order to demonstrate their capabilities at the Center's McKinley Range (Redstone Arsenal, Ala.) OE test site. This site includes conventional seeded OE items from 20mm to a 2000-lb. bomb as

well as chemical site simulates with test kits and trench areas.

The contractors will also have the opportunity to demonstrate navigation methodologies in open and wooded areas. These demonstrations will be performed in early June. The performance at this site will be used as the basis for the Government to match the appropriate vendor with the technology and OE project.

A comparison report of the capabilities will be independently created for distribution to the OE community. Huntsville Center plans to utilize this contract when the needs of the program are best served by performing these services directly to the Center. The objective of the process is to learn enough to improve DGM performance as applied to the Center's OE needs.

\$50m Fort Ord contract award underway

The Sacramento District has issued a Request For Proposals (RFP) for a new Ordnance and Explosives (OE) Cleanup contract for the former Fort Ord, Calif. The RFP called for a base bid of one year plus four option years, at \$10m per year, or a maximum of \$50m. The RFP also called for a combination of Firm Fixed-Price (FFP) and Cost Reimbursable (CR) task orders.

The RFP was issued in late March, and will be the first large scale OE contract issued by Sacramento for design and execution work. Proposals were received in the District office in May, and award of the new contract is expected by early July 2000.

The Sacramento procurement is structured similarly to both the upcoming Huntsville Center \$200m contract award, and the Fort McClellan contract issued last fall.

\$200m contract

(Continued from page 1)

basis. This arrangement, along with the broad scope of services required by the contracts, encourages teaming of contractors. Although other contract vehicles are available and will be used by the Huntsville Center according to specific needs, the proposed new contracts are expected to be the primary source of acquisition over the next few years. Along with single integration responsibility, they bring strength and versatility through contractor teaming, a good combination by any measure.

Business team

(Continued from page 2)

Negotiations have been underway with the Army Environmental Center (AEC), Corps Headquarters and Army agencies on the OE Business plan. A possible final meeting to resolve the remaining issues has been scheduled with AEC. This plan proposes that the Huntsville Center OE team manage the Army's (and potentially the DoD's) OE program.

Finally, the Huntsville Center OE Business Team continues to conduct meetings with the Corps' Divisions. Program and project reviews, and RBC/OE business issues are part of the discussions. Initial comments from the field to the OE Business Team indicate that these meetings and the ensuing discussions are extremely beneficial to both parties. The OE Business Team plans to brief every MSC by the end of the fiscal year.

If you have any Huntsville Center OE business questions, please contact Glenn Earhart at (256) 895-1577.

Classification of secondary explosives in environmental media

Resource Recovery and Conservation Act (RCRA) perspective

By Ed Bave, Omaha District
HTRW Center of Expertise

This is the second of a three part series of articles presented by the Hazardous, Toxic, and Radio-logical Waste (HTRW) Center of Expertise (CX), Omaha (Neb.) District. The first article addressed program issues. The next (third) article in the series will discuss secondary explosives in environmental media as Department of Transportation (DOT) hazardous material.

In the previous article, programmatic issues as they relate to roles and responsibilities of the Centers of Expertise and geographic districts were discussed. Those issues are detailed in Engineering Regulation (ER) 1110-1-8153. Closely related to programmatic issues are the field execution issues associated with classifying secondary explosives (SE) as a hazardous waste. This is important in defining what regulations must be complied with for both on-site and off-site remediation activities. Soils contaminated with SE at > 10% by weight are by definition (ER 1110-1-8153) "explosive soils." This definition is clearly related to program execution and the inherent safety concerns unique to remediation efforts addressing sites with SE. The connection of this definition to the hazardous waste regulations lies in large part with the original scope and intent of the Arthur D. Little report *Testing to Determine Relationship Between Explosive Contaminated Sludge Components and Reactivity* 31 Jan 1987.

The abstract of that paper indicates that the primary

goal of the testing was to develop a relationship between SE concentrations and the RCRA definition of reactivity (i.e. 40 CFR 261.23). These results have been used in programmatic, safety, and waste classification decisions. It appears now that the first two issues have been resolved and clarified in ER 1110-1-8153. The third issue merits further discussion.

Classification

From an HTRW perspective, personnel making a hazardous waste classification determination for environmental media (soils) contaminated with explosive products should immediately think in terms of characteristic wastes and listed wastes. Reactivity (D003), ignitability (D001) and toxicity characteristics leaching procedure (TCLP) are examples of potential characteristic waste codes which must be evaluated.

Reactivity and ignitability are physical properties. TCLP is an analytical test method to determine the leachability of specifically identified chemical compounds. Of the 40 constituents identified under the regulations (40 CFR 261.24), only two are typically associated with secondary explosives; 2,4 Dinitrotoluene (D030) and Nitrobenzene (D036). Facilities manufacturing primary explosives, will likely have lead (D008) and mercury (D009) contamination associated with the lead azide, lead styphanate and mercury fulminate initiators. These metals may cause a soil to fail the TCLP analytical test and therefore meet the definition of a hazardous waste.

However, a reactivity determination is not near as clear-cut as a TCLP test. There are eight subcategories of reactivity; three are applicable to secondary explosives in soils (261.23(a)(6) – (8)). The first ((a)(6)) defines a material which "is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if it is heated under confinement."

The second ((a)(7)) is a material that "is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure."

The third definition is outdated, referencing DOT forbidden, Class A, and Class B explosives (future article). The Arthur D. Little Report focused specifically on the first subcategory defined above by using the Bureau of Mines (BOM) Zero Gap (shock) and Deflagration to Detonation Transition (DDT flame) tests.

Program safety value

The tests used water-wet and dry RDX and TNT mixed with sand. Respectively, the results of these two tests indicated that < 15% SE in soils and < 12 % SE in soils would not react explosively and hence would not be Environmental Protection Agency (EPA) reactive. Apparently Department of the Army and the Corps have reduced that value to <10 % for program and safety related issues and it is carried over to the RCRA reactivity definition found at 40 CFR 261.23(a)(6). That is the

fundamental assumption that has been made within the HTRW program. Soils contaminated with < 10 % secondary explosives are not presumed RCRA reactive (D003).

Listed and characteristic wastes were referenced earlier. Listed waste associated with explosives are defined as K044 – K047 (40 CFR 261.32). These listed wastes, with the exception of K046 (lead constituent), are listed for the reactivity characteristic only. There are no chemical constituents for which those wastes were listed.

Verification

This point is important, as there are other subtleties that deal with listed wastes that no longer exhibit the characteristic for which they were listed. This issue is tied to the "mixture rule" and its relationship to the "contained-in" policy for environmental media contaminated with a listed waste.

Issues such as these are not black and white and should be discussed with the HTRW CX and appropriate regulatory agency. With the implementation of ER 1110-1-8153, executing districts, the OE CX and the HTRW CX should be in agreement on hazardous waste classification assumptions and partner with the regulatory community for an efficient site remediation.

Range cleanup of ordnance and explosives tops corps' list of priorities

By Angela Dixon, Huntsville Center

The Department of Defense has active military ranges throughout the country that soldiers use for training purposes. Unexploded ordnance and range residue (scrap) materials ranging from small caliber ammunition to large caliber tank ammunition, trucks, tanks and other targets often remain at the site. Cleanup of these ranges is essential to maintaining military readiness because piles of range residue can significantly impact training on the ranges.

According to Glenn Earhart, the business development manager for the Ordnance and Explosives directorate at the Huntsville Center, the Corps has an important role in assisting the Army in sustaining the Department of Defense's ranges. "The Corps of Engineers, including the Corps headquarters, divisions and labs, the Huntsville and Omaha Mandatory Centers of Expertise and the Corps districts have the expertise to assist in cleanup of active and closed, transferred and transferring ranges," Earhart said. "We are currently involved in many of these types of ordnance projects," he said.

What is the importance of removing range residue and unexploded ordnance from ranges?

According to Earhart, there are several important reasons. First and probably most important is the need to sustain range readiness. "Soldiers must be able to continually use the ranges for target practice," Earhart said. "There is now a Department of Defense directive that requires installations to conduct long range planning which includes everything from firing to cleanup to ensuring range sustainability. It makes good

sense and makes the military a good neighbor," he said. The Corps of Engineers is committed to supporting the total Army including its training missions.

Second, there is the issue of safety. In 1997, in a recycling yard in Fontana, Calif., a salvage worker was killed when he unknowingly cut into a live round. "Scrap is moved, sold and recycled by various entities, therefore, it must be free of explosive material," Earhart said. "We need to make sure this does not happen again. Safety is a paramount concern that cannot be compromised."

Finally, the concerns raised by the environmental community suggest that ordnance left on the ranges has potential to contaminate ground water and soil. One example is the Massachusetts Military Reservation (MMR). The MMR is a National Guard facility and a former range used by the Army and Air Force. The Environmental Protection Agency (EPA) conducted a study and found lead contamination in the groundwater. The range is temporarily closed and the Department of Defense is conducting extensive studies and clean-up operations at the site. The National Guard requested the Corps of Engineers assist in those operations.

One example of projects supported by the Corps of Engineers is the range clearance and scrap certification and disposal underway at Fort Irwin, Calif. Another is a range clearance project at Fort Drum, N.Y.

The Corps of Engineers has cradle-to-grave capabilities for all aspects of ordnance related issues on installations. The \$50 million dollar program to clean up Formerly Used Defense (FUDS) and Base Realignment and Closure sites (BRAC) is a total Corps of Engineers program that supports the Chief of Engineers "One Door to the Corps" vision on closed, transferred and transferring ranges. For more information call Glenn Earhart at (256) 895-1577.



Compiled range scrap awaits disposal.

Japan District assists with ammo furnace

By Doyal Dunn, Japan District

Ever wonder, what happens to ammo with an expired shelf life?

The Army uses demilitarization to totally destroy the military offensive or defensive attributes inherent in certain types of ammunition. Mutilation, burning, detonation, cutting, crushing are some of the processes it uses to "demil" inert and live ammunition, according to 83rd Ordnance Battalion's Ammunition Production Manager, Wayne Tewkesbury.

His unit will soon have an environmentally safe way to dispose of small explosive components at Kawakami Ammo Depot.

Its new "Demil Furnace" will de-activate small explosive components, such as approved small arms ammo, artillery fuzes, blasting caps, primers, and any small explosive devices through incineration, according to Tewkesbury.

"Ammunition stored for any length of time eventually begins to deteriorate. When this occurs, the item is either renovated or destroyed. At this time, there is no approved incineration capability in the Pacific Far East," Tewkesbury explained.

"The US-funded furnace will provide a safe and environmentally approved way of disposing of these items. Plus, it will save the cost of shipping back to the Continental United States (CONUS) for destruction, and will even generate a little money from recycling of the metals," said Tewkesbury.

The joint use facility has been designed to incorporate some of the demil workload of the Marines, Air Force, and

Navy. An important benefit beyond the cost savings is the safety factor, Tewkesbury said.

"Range brass (expended small arms) is normally collected and turned in to the Defense Reutilization Marketing Office (DRMO). However, it requires 100 percent visual screening to preclude live ammo from being inadvertently turned over to the general public," Tewkesbury continued. The Demil Furnace will ensure the brass' safety.

The Demil Furnace has three major parts - the feed room area, the retort assembly or incineration chamber, and the pollution abatement system.

Unserviceable ammo will be stationed in the feed room where 83rd Ordnance Battalion operators will load and space ammo on a conveyor at a predetermined feed rate. They will program the furnace through an automated control panel for the particular item to be demilitarized. The items will move up the conveyor and into the incineration chamber where the furnace temperature will reach about 1200 degrees F. The munitions will then explode within this safely contained area and be rendered "demilitarized," explained Tewkesbury.

The last and most important part of the system is the state-of-the-art pollution abatement design. Any hazardous gases that may be generated by the furnace are processed through a series of ceramic filters within the baghouse. The end result is a clean and environmentally safe gas release, he said.

The 83rd will then collect and weigh the brass, steel, or other recyclable metals for turn-in to DRMO. This is where another benefit comes to play.

According to Tewkesbury,

the services will save money by avoiding the cost of shipping the items back to CONUS for destruction plus they will generate a little money by recycling the metals through DRMO.

Tewkesbury credits the Japan Engineer District for providing the expertise needed to ensure the project is a success.

"Without Japan Engineer District, the 83rd Ordnance Battalion never would have been able to begin this project. They provided the guidance on all levels to get the construction part of the plan moving. From the initial environmental and engineering study, they have guided us all the way to where we are today," Tewkesbury said.

"We have a good rapport with their personnel and meet repeatedly on issues to iron out problem areas. There was a lot of technical data sharing with Japan District (JED) on equipment specifications in the infancy stages of this project. However, the equipment being installed is not part of JED's responsibility; this is Army-owned equipment."

"The District did the leg work to get the contractor to place the concrete and utilities, their expertise and oversight in the planning and monitoring of the construction has been exceptional to say the least, and we expect to be finished a little ahead of schedule due to some innovation of their part," Tewkesbury concluded.



Honolulu Engineer District cleans up former Guam military storage site

By Larry Hawthorne, Honolulu District

Honolulu District is undertaking a Guam cleanup operation to rid a private Mong-mong village property of any remaining buried chemical identification training kits that may have been left over from World War II. The privately owned lot was part of what once was the 5th marine Field Supply Depot during and shortly after World War II. In the 1950s the land was turned over to local government before it later ended up in private hands.

The project involves excavation of marked locations on the Biang Street site identified during a recent geophysical survey and plotted on a site map as so-called "anomalies." The anomalies indicate something may lay below the surface with an electromagnetic signature similar to items discovered on the site in July of last year when the property owner turned up 16 iron canisters called "pigs" while excavating a trench on the land. Responding local government and federal agency and military officials at the time identified the sealed canisters as containing Chemical Agent Identification Sets (CAIS). Now obsolete, the test kits were commonly used by American soldiers in training exercises to detect and protect themselves against possible exposure from chemical attacks. The kits consisted of 12 glass vials, most of them filled with diluted samples of chemical agents: Mustard, phosgene, lewisite, and chloropicrin. Although relatively weak in strength they are able to give training soldiers a "whiff" of what they could expect in terms of smell and properties if they were confronted by stronger chemical agents in the field.

To date, ongoing excavation work has turned up 17 of the iron canisters and more are expected to be found. When removed, each canister is then encased in heavy, stainless steel tubing and transported to Anderson Air Force Base for temporary storage. Eventually all will be sent to Johnston Atoll for final destruction.

Also assisting Honolulu District are Guam government agencies and local officials and law enforcement, Navy and Air Force ordinance and standby medical personnel, the Army Corps' Huntsville Center, Edgewood Chemical and Biological Center, the U.S. Army Technical Escort Unit, as well as contract

specialists from Parsons Corp., Human Factors Applications, Environmental Chemical Corp., and others involved in waste management and removal.

Central to the on-site cleanup is a 30-by-40 foot tent in which most of the work takes place.

The tent—called an engineering control system, or filtered shelter—enables cleanup personnel to confine and contain each location as it is excavated and evaluated for any material requiring removal. Officials said they are encountering everything from old car bumpers, to sheet metal, to construction debris to more of the canisters themselves, but don't know until they actually do the excavation. Safety and site controls are in place to protect on-site workers, the nearby public and local environment.

"Some will say this is tremendous over-kill on our part," said Helene Takemoto, Corps of Engineers on-site project manager. "But it's the nature of the projects like this that we take every precaution against any possible risk, no matter how remote. I think our containment and filtering systems are examples of that."

One major precaution in addition to the enclosed tent that is moved from spot to spot as the excavation and probing progresses, is a multi-stage filtering system. The system filters all of the air inside the tent and tests it for the presence of any of the chemical agents. If any are detected alarms sound that warn the workers to take additional precautions.

The filtering systems consist of two 18-inch wide charcoal beds, with monitoring equipment before, during and after the air enters the system. Workers keep careful note of any changes in the ambient air supply that could require adjustments in the level of protection. In most instances, workers remain in work overalls with respirators slung on their belts. If suspected test kits are encountered they change to the chemical resistant special clothing—the "space suits"—that provide protection against any chemicals encountered during the operation.

A public notification system is also in place.



Pictured above left, the filtered shelter used for the Guam operations.

Below left, "pigs" recovered at the site.

(See Guam cleanup, page 11)

Two pit excavations complete at Spring Valley

By Doug Garman,
Baltimore District

Last month, Army ordnance experts finished their search for buried World War I chemical agents in the backyard of the South Korean ambassador's residence in the Spring Valley neighborhood of Washington, D.C.

During the yearlong effort, experts investigated two disposal pits once used by researchers at the former American University Experiment Station between 1917 and 1919.

While excavating the pits, workers safely removed 288 ordnance-related items and about 435 various kinds of cylinders, pipes, glass containers, metal drums, wooden training aids and various pieces of unidentifiable scrap metal, glass and ceramic pieces.

"We carefully checked each of these items to determine if they contain any traces of chemical warfare agents," said Maj. Brian Plaisted, Baltimore District project manager.

"Fortunately, many of the items were empty or contained smoke compounds, sulfuric acid and other laboratory compounds, but we did find 14 items that contained chemical warfare agent," added Plaisted.

All of the soil excavated during this search, nearly 1,400 55-gallon drums and several large truckloads, was tested and analyzed for compounds related to chemical warfare agents before being removed from the site.

"We had hoped to begin restoration of the site this spring, but the results of soil sampling taken late last year from the ambassador's property indicated that portions of the backyard contained levels of arsenic higher than acceptable for residential areas," said Plaisted.

At that point, site restoration efforts were placed on hold until Army officials could better characterize and assess the extent of the arsenic issue.

In February, 266 additional surface soil samples were collected from the property.

These samples are being reviewed and analyzed.

Using these results and previous data, Army experts are preparing a comprehensive risk assessment for the site to evaluate if any risk to human health is posed by the elevated arsenic levels.

"We will recommend appropriate cleanup actions as part of an engineering evaluation of possible alternatives," said Plaisted.

To help determine if any properties adjacent to the ambassador's property contain elevated levels of arsenic, additional soil sampling data will be collected later this year.



Pictured above, the vapor containment structure used for the excavations at Spring Valley.



At left, items recovered at the site.

Guam cleanup

(Continued from page 10)

It provides for green, yellow or red flags to be displayed on the site to indicate normal operations, including the discovery and normal disposal of additional test kits. A yellow flag will be displayed only in case of a release of chemicals inside the tent that presents a significant load on the filtration system. A red flag would be posted if chemical is released to the outside atmosphere.

During yellow conditions, Guam Police Department cruisers would drive through the neighborhood and police officers would use their public address systems to instruct local residents

to stay indoors, close windows and doors and turn their air conditioners to recycle inside air. During yellow conditions, residents could leave if they wanted, but would be asked to stay put if conditions turned to red.

"We don't envision any yellow or red episodes at all during this operation," said Takemoto. "But we have to plan for them just in case."

The operation is scheduled to take about a month and a half to complete, but could take longer depending on what is found.

Memphis Depot chemical warfare materiel removal project begins

By Clyde Hunt, Memphis District

The Memphis Depot Caretaker Division and the U.S. Army Corps of Engineers officially launched the Dunn Field Chemical Warfare Materiel (CWM) removal project with a ribbon cutting on March 17 for the Vapor Containment Structure (VCS).

Construction of the vapor containment structure marks the first step towards the safe removal of CWM from Dunn Field. In an effort to provide important information about the project to the community, the Depot hosted a media day and a Community Information Session.

The media representatives who attended the March 17 media day toured the vapor containment structure and the other safety measures used to ensure a safe, effective removal including four air filtration systems, video cameras and monitoring equipment. The vapor containment structure will cover each of the areas where CWM will be removed. The air filtration systems will remove any vapors that may be released within the structure.

"The vapor containment structure at Dunn Field is constructed to contain any and all vapors that could potentially be released and remove them from the air through four filtering systems," said Wilson Walters, Safety Specialist for the Corps' Huntsville Center. "The structure provides an increased measure of safety and protection to the nearby community."

At the Community Information Session on March 18 at Corry Middle School, representatives from the U.S. Environmental Protection Agency, the Tennessee Department of Environment and Conservation, the U.S. Army Corps of Engineers, the Memphis/Shelby County Emergency Management Agency, and the Product Manager for Non-Stockpile Chemical Materiel discussed the project with the 25 members of the community.

The project engineers and safety specialists conducted two technical presentations during the community information session. The presentations explained the CWM removal project and the safety measures being used to provide the highest possible level of protection for the community in the event of an emergency, or maximum credible event.

The scope of work for the CWM removal

project is centered on three sites at Dunn Field: the removal of the Chemical Agent Identification Sets (CAIS) at Site 1; the removal of the bomb casings at Site 24B; and, the examination and removal of any CWM in the neutralization pit at Site 24A. All intrusive activities are within the VCS, a structure that is 70' in diameter and 32' in height and covers a 3800 square-foot area. The VCS will contain and filter any CWM that might be released during the excavation.

Pre-operational activities, an assessment of work site safety and emergency response procedures, began the week of April 19 for all agencies involved in the project. These exercises are required by the Department of Army Safety Personnel to ensure that all provisions of the Site Safety Submission and Army regulations are followed. The exercises were also done to ensure that the air monitoring and video equipment were working properly and that all personnel involved with the removal project could respond to any given emergency scenario.

Huntsville Center and their contractors began intrusive work at Site 1, Thursday, May 4 and the removal is expected to be complete by the end of August. No CWM has been found to date.

Twenty-four, 3-½ ounce, empty "K-941" bottles were found packed in a box with their stoppers next to the bottles. No chemical agent was detected from the bottles or soil. We expect to find "K-951" chemical agent identification sets at Site 1 and we are continuing excavation for these sets. As of May 30, the excavated area was 30' x 8' x 10'. A total of 121 cubic yards has been removed since excavation began May 4.



Pictured above, the vapor containment structure at Dunn Field.



At left, On-Site Coordinator Clyde Hunt of Memphis District addresses stakeholder questions at a weekly project status meeting.

Innovative technology demonstrates new tools and techniques

By Scott Millhouse,
Huntsville Center

This article is intended as an overview of Ordnance and Explosives-Innovative Technology (OE-IT). Innovative Technology means different things to different people. Most people think of Research and Development (R&D). That is not part of Huntsville Center's traditional mission area or the purpose of the OE-IT funded mission. The R&D mission belongs to the Corps and other National Labs. Huntsville Center's role with OE-IT is to support the transition of R&D methodologies to a real world application after they have been proven in the lab. Essentially the Center assists in transitioning from the limited "sand box" tests with perhaps the R&D bread-board equipment approach to a fieldable system that may not yet have been fully optimized. The

*objective is to take **Innovative Technology**, perform **Technology Implementation**, and if applicable **Technology Transfer**, so that we may purchase the services commercially applied to our OE projects (see box for definitions). This testing also applies to techniques used for a different mission for evaluation on application to the OE problem. Initial application needs additional control, reporting and changes in direction to determine reasonable cost and performance objectives and to support competitive implementation to OE projects. This generally adds a cost and time burden that a project customer can not afford for an unproven (in the field) technology. The OE-IT funding is used to offset this additional burden.*

Huntsville Center has been implementing the OE-IT

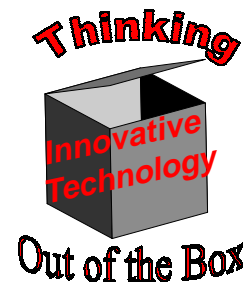
program to develop, demonstrate and validate new tools and techniques that may assist in improving its performance at OE Formerly Used Defense Sites (FUDS). This program has historically been funded at \$1.45 million annually. Typically the funds are allotted to many small dollar initiatives to evaluate or support

technology performance at active OE sites. Funds generally are expended by distribution across in-house labor and support and tasks to be performed by contractors and Government labs. These funds are leveraged with project, other agencies and contractor's contributions to ensure maximum value. For contractor performed work whenever possible we use existing OE contracts. The proposed Ordnance Response and Services for the Continental United States (CONUS) and Outside the Continental United States (OCONUS) Sites, commonly called the "\$200m contract," will be a principal recipient of these funds over the next five years.

The OE-IT manager's principal responsibilities are to administer the program, assist in transfer of applicable technologies to projects, represent the OE-IT program to Department of Defense (DoD), regulatory and R&D groups, present at the various Forums and Symposiums, perform technology evaluations, administer work for others and compete for external funding. The external funding is generally by competitive proposals to the Environmental Security Technology Certification Program (ESTCP) of DoD and others to leverage with OE-IT funding contributions.

Mission area examples

On a typical OE project, Huntsville Center has a large formerly used area that has possible OE contamination. Footprint reduction techniques are used to concentrate the
(See Innovative technology, page 14)



Key Technology Definitions

Innovative Technology: 1) A technology which is significantly better, cheaper, safer or faster than existing technologies, that is not broadly applied due to limited knowledge or established standards within the engineering community..

2) A technology that is not commercially available from one or more vendors which has the potential to be better, cheaper, or faster than existing technologies. This may include technologies that are currently under development that have not been tested or evaluated on a full-scale project.

Technology Implementation: A process that includes expansion of stakeholder awareness, information dissemination, development of standard procedures and protocols, development of cost and performance reports, and other actions that encourage technology users to evaluate, procure, install, monitor, and operate previously unused or underutilized technologies.

Technology Transfer: Transfer of a government developed technology to private and/or commercial applications for the purpose of stimulating commercial activity and national technology leadership.

Innovative technology

(Continued from page 13)

areas of investigation to the OE areas of concern. They may include image processing with analysis of current and historical aerial and sensor images, ground reconnaissance and using either airborne or ground based sensors to identify target anomalies. Current OE-IT emphasis is on the use of airborne magnetometry. Infra-red, multi-spectral, hyperspectral, Synthetic Aperture Radar (SAR) and LASER imaging are also being investigated and applied as well as Unmanned Aerial Vehicles (UAV). We are conducting a proof of concept demonstration of the most promising existing UAV equipment to determine if they can identify and locate OE size items. Other techniques include ground based geophysics with characterization by transects and meandering path methodologies with mathematical predictions.

In the structural area the Center is developing water mitigation for intentional detonations, advanced materials testing for barricades, OE penetration studies, updating documents, fielding Mapping Explosive Safety Hazards (MESH) and creating Department of Defense Explosive Safety Board (DDESB) safety submissions.

For characterization, Huntsville is performing validation, integration and improvement and work on statistical tools with emphasis on regulatory acceptance for UXO Calculator, Meandering Path, and Transects approaches as well as investigating and development of new tools and techniques.

To support the range residue issue the Center is performing literature searches

for new tools, techniques and methodologies as well as investigating biological treatment to remove range residue contamination.

To support Unexploded Ordnance (UXO) disposal Huntsville is testing the Donovan blast containment structure within a vapor containment structure for testing destruction of chemical munitions as well as testing the use of commercial shape charges for detonation and disposal applications.

Life Cycle Data Management is an approach, structured procedure and a series of custom digital tools that one uses to facilitate capturing all data digitally and in compatible formats. This facilitates assembly into the Ordnance and Explosive Geographic Information System (OE-GIS). All historical data, imagery, textural, geophysical, sensor and mapping data are coincident. This data can be associated and analyzed to facilitate project execution, predictions, results summaries and to create unique outputs. This approach, when applied to the OE Program, creates commonality across projects to allow sharing of experience, tools and techniques. As an added benefit it supports a digital administrative record. OE-IT is developing and enhancing this approach with the addition of new tools and techniques.

Geophysics for OE-IT is digital geophysical mapping. All data is recorded digitally with positional coordinates. Huntsville is investigating new equipment and creating tools and techniques for analysis. Examples include traditional instrumentation as well as linear path ground

penetrating radar, seismic, and acoustic. In addition it is

creating a geophysical signature database that associates the ground truth results with the geophysical data to make predictions of the anomalies that are closest to the targets.

The Center is creating Quality Assurance (QA) tools and techniques to verify field accuracy with validation at the McKinley Quality Assurance/Quality Control (QA/QC) grids. This area has been expanded to add sand trenches, impact clutter, CWM area simulations and woods navigation. In addition this resource is used as a training area for geophysicists and safety specialist to get experience in industry standard Digital Geophysical Mapping equipment.

To effectively direct the OE community to create tools and techniques to support its field efforts, Huntsville Center must actively participate in demonstration and evaluations of technology.

The Center's goal is to partner and create Strategic Environmental Research and Development Program (SERDP) R&D and ESTCP Technology Demonstration and Evaluation competitive proposals that are selected and funded. This allows Huntsville to leverage our limited funding to make real progress and to direct technology advances.

OE-IT MISSION

Explore, demonstrate, validate and implement innovative techniques, methodologies, materials, equipment and procedures to support the Huntsville Center OE mission.

HUNTSVILLE CENTER STRATEGIC PLAN

- Strategic Goal 1.0 – Develop and Implement Footprint Reduction Techniques to focus field activity to specific areas of interest.
- Strategic Goal 2.0 – Create and implement Other Tools, techniques and procedures to directly support the CEHNC and DoD OE Program.
- Strategic Goal 3.0 – Create a Life Cycle Data Management Process that includes Digital Geophysical Mapping and Implement it across the Huntsville Center OE Program.
- Strategic Goal 4.0 – Compete and gain funding from outside sources for OE Technology Initiatives.



Southwest Proving Ground work compares 'mag and flag' to digital geophysics

By Scott Millhouse, Huntsville Center and David Lieblich, SC&A

As part of an ongoing effort to evaluate the best technology alternatives for subsurface Unexploded Ordnance (UXO) investigations and removals, Huntsville Center directed a test at Range 12 of the former Southwest Proving Ground (SWPG), Ark. The primary objective of this test was a quantitative comparison of "Mag and Flag" (M&F) to Digital Geophysical Mapping (DGM). Detection of 40 mm and larger UXO, and detection of UXO to a depth of two feet below ground surface, are the criteria upon which the performance comparisons were evaluated. The results are quantitative performance comparisons over each of nine investigated grids and across all nine grids. In addition, a quantitative cost comparison that accounts for all costs incurred, from pre-survey, through survey, and post-survey is included. This comparison was developed using the nine grids to obtain the comparative remediation cost breakdown for a typical 40-acre site, such as Range 12.

Project site

The test area comprises nine 100 x 100 foot grids within Range 12 of the former SWPG. Range 12 was formerly used for artillery practice. It contains UXO ranging in size from 40 mm to 155 mm, as determined by M&F excavations at the site. M&F results indicate these grids have an average target density of 2275 targets per acre. The area covered by the nine grids is relatively flat and with minimal vegetation; this presents no difficulty for array-based data collection. Locally, tree cover can interfere with Global Positioning Systems (GPS).

Technology description

Standard technology was deployed for each method to provide results indicative of those obtained during typical site operations. The contractor ATI conducted M&F surveys using Schonstedt GA-72 instruments swept over 5-foot lanes. The contractor SC&A conducted DGM using man transportable carts and sensor arrays positioned with real-time, differentially corrected, GPS. Sensor arrays included: 6 Geometrics G858, total field magnetometers spaced 2 feet apart and 18 inches above ground; a dual EM-61 array spaced 3.28 ft apart and 18 inches above ground; and 5 Foerster vector gradiometers spaced 1.64 feet apart and 12 inches above ground. Foerster gradiometers were deployed in an array posi-

tioned using a Trimble 4000 RTK GPS and merged using Sensys' hardware and software. Total field magnetometer and EM-61 arrays were positioned using Trimble Pro-XRS DGPSs and merged using SC&A's software. Targets were picked by SC&A, using standard threshold methods and manual picking.

Results

Analysis of the nine grids indicates that DGM reduced the number of non-UXO dug by a factor of about 6:1, while retaining UXO and UXO-like targets. DGM will reduce the overall costs (pre-survey through disposal and final reporting) by a factor of more than two, on a 40-acre site (see table below). The cost reduction factor is smaller than the dig reduction factor primarily because DGM incurs additional pre-survey costs. At a 1-meter detection radius, gradiometers found 89 percent (34), of the M&F UXO (38), magnetometers found 74 percent (28) and EM induction found 53 percent (20).

This success rate improved significantly when the radius is increased to account for positioning errors. The percentages remain lower than expected, owing largely to positioning errors that accumulate through the process: DGM positioning needs to improve towards a ½ meter goal. This positioning error problem was partially caused by how the test was set up. Rather than performing sampling to determine success, the non-intrusive operations were kept totally separate and performed a year earlier than M&F operations.

The table at right provides a cost comparison of a complete project cost from the customer's perspective based upon a 40-acre site using cost and performance data gathered between the



"Mag & Flag" teams used Schonstedt GA-72 on 5 foot lanes with RTK GPS location of flags.



Magnetometer array 6 (mag array with DGPS).



EM-61 array (dual array with DGPS).

Task	DGM	M&F
Site Visit	\$ 10,000	\$ 5,000
Nonintrusive Work Plan	\$ 10,000	
Intrusive Work Plan	\$ 12,500	\$ 12,500
Environmental Safety Submission	\$ 10,000	\$ 10,000
Survey Control	\$ 5,000	\$ 5,000
Mob UXO	\$ 14,000	\$ 14,000
Mob DGM Proveout and Survey	\$ 20,000	
Vegetation Removal	\$ 52,000	\$ 35,000
Surface Avoidance	\$ 14,000	
Mob UXO	\$ 2,000	
DGM	\$ 36,000	
M&F		\$ 80,000
Geophysical Analysis	\$ 10,000	
Reacquisition	\$ 32,000	
Excavation	\$ 111,000	\$ 682,500
Scrap Disposal	\$ 3,000	\$ 5,000
UXO Disposal	\$ 24,000	\$ 24,000
Engineering Report	\$ 10,000	
Removal Report	\$ 15,000	\$ 15,000
Government dig QA	\$ 16,000	\$ 98,378
Government Engineering Support	\$ 16,000	
Total	\$ 422,500	\$ 986,378

(See SWPG comparisons, page 16)

SWPG comparisons

(Continued from page 15)

two techniques. These costs include Government administrative and Quality Assurance (QA) expenses. As can be seen DGM is less than 50 percent of the cost of the more traditional approach.

The evaluation is still not complete since there are a significant number of targets identified by magnetometry, EM induction and magnetic gradiometry that were not identified by M&F. M&F and DGM can leave UXO in the ground, however; this test could not determine the absolute number of targets left in the ground. Only relative comparisons

can be made from unsifted live-sites, in contrast to the absolute numbers that can be obtained from seeded test-sites.

Future activity

Excavations to evaluate the DGM targets missed by M&F are planned. The three DGM instruments identified additional anomalies that have not been sampled. Huntsville Center has prioritized 147 anomalies to sample with remaining funds. Final results will be provided in the technical report describing the investigation with distribution via posting on the Huntsville Center OE web site.



Gradiometer array-5 (gradiometer array with RTK GPS).

UXO Forum

(Continued from page 3)

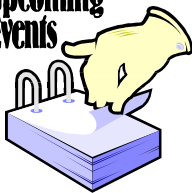
Ordnance and Explosives (OE) Business Team, agrees that Huntsville Center's presentations corresponded to the keynote speeches of the Forum. Earhart's presentation, "Processing and Disposal of Range Scrap," was the very first presentation of the first session, and discussed the importance of a comprehensive and standardized process for the life-cycle management of range scrap. "Gary Vest emphasized that the DoD Directive for Environmental Safety and Explosives Management on Active and Inactive Ranges (issued last fall) provides the process to be followed. That directive is exactly what we are using to do our work," said Earhart.

Carol Youkey, with Huntsville Center's OE Center of Expertise, summarized the event as, "Part business, part public relations." She said it also provides an opportunity for people to meet and get together, "that might otherwise have difficulty setting up a time and location for a larger group."

One example she cites is the breakfast meeting between members of the Huntsville Center OE Team and member of the Laborers' International Union of North America UXO Worker's Union (see story page 4). "It's great that the OE community is able to meet each year. The Forum is a great way for all of us in the OE community to stay in touch."

All Huntsville Center presentations made at this year's UXO Forum can be accessed at <http://www.hnd.usace.army.mil/oew/foruminx.htm>.

Upcoming Events



29th DoD Explosives Safety Seminar

July 18—20, 2000

New Orleans, La.

POC: Mr. Brent E. Knoblett,

DSN: 221-1375

Commercial: (703) 325-1375

Fax: (703) 325-6227

E-mail:

Brent.Knoblett@HQDA.Army.Mil

DoD Policy and American Indian Cultural Communications Course

July 24-27, 2000

White Sands Missile Range, N.M.

POC: Dr. Donata Renfrow,

Toll free: (877) 811-9621

DSN: 367-4241

E-mail:

drenfrow@aepl.army.mil